

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on August 28, 2000, and the references cited therewith.

Claim 1 is amended, claims 4 and 12-20 are canceled, and no claims are added; as a result, claims 1-3 and 5-11 are now pending in this application.

Affirmation of Election

As provisionally elected by Applicant's representative, Janal Kalis, on August 9, 2000, Applicant elects to prosecute the invention of Group I, claims 1-11.

The claims of the non-elected invention, claims 12-20, are hereby canceled. However, Applicant reserves the right to later file continuations or divisions having claims directed to the non-elected inventions.

§103 Rejection of the Claims

Claims 1, 2, 4, 5, and 7-11 were rejected under 35 USC § 103(a) as being unpatentable over Gulett et al. (U.S. Patent No. 4,330,569) in view of Katayama et al. (U.S. Patent No. 5,372,677). The method claimed in claims 1, 2, 5, and 7-11, of the present invention treats a "silicon-nitride film in an atmosphere comprising oxygen plasma wherein the oxygen plasma flow rate is at least about 300 sccm oxygen." The amended claim 1 describes the time of treatment as within a range of 10 seconds to 5 minutes.

The Gulett et al. patent does not discuss oxygen flow rate at all, but does describe a treatment time as 10 to 15 minutes. The Applicant asserts that the oxygen flowrate claimed cannot be imputed to the Gulett et al. method because, as discussed in the application, this flowrate range would be expected to damage, not enhance, a silicon-nitride film. The effect observed and claimed is an unexpected effect. The Katayama et al. patent provides further support for the Applicant's position. Katayama describes an oxygen flowrate of only 20 cc/min. This is much lower than the 300 sccm claimed. The Katayama reference then supports the Applicant's position that the oxygen flowrate claimed is unexpected.

Claims 4 and 6 were rejected under 35 USC § 103(a) as being unpatentable over Gulett et al. (U.S. Patent No. 4,330,569) in view of Katayama et al. (U.S. Patent No. 5,372,677) and

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further in view of Spencer et al. (U.S. Patent No. 4,673,456). Claim 4 has been cancelled. For reasons discussed for claim 1 et al., the Gulett and Katayama references do not render claim 6 obvious. To the contrary, these references demonstrate the unexpected effect claimed because neither of these references contemplated the large oxygen flowrate claimed. The Spencer reference generally discusses plasmas but does not discuss the specific application of the present invention.

The Examiner stated: "Regarding the difference in the range of pressure, flow rate, power and time between the application and the prior art, it would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art."

The Applicant challenges the accuracy of this statement. The inventors believed that the use of the oxygen flowrate, claimed for the time claimed, produced an unexpected effect because of the high energy generated. The expectation is that the silicon nitride layer would be damaged if not destroyed. Instead, the silicon nitride is strengthened to a degree that renders it resistant to footing and undercutting. The references cited by the Examiner support the Applicant's position. The Katayama reference described an oxygen flow rate of 20 cc/min. However what is claimed is 300. The other references did not address oxygen flowrate and the flowrate claimed cannot be imputed to them.

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CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6976 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

ZHIPING YIN ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

P.O. Box 2938

Minneapolis, MN 55402

(612) 373-6976

Date 28 Nov. 00

By J. M. Kalis

Janal M. Kalis

Reg. No. 37,650

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 28 day of November, 2000.

Janal M. Kalis
Name

J. M. Kalis
Signature

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